

## **Urban coral reefs: Degradation and resilience of hard coral assemblages in coastal cities of East and Southeast Asia**

### **ABSTRACT**

Given predicted increases in urbanization in tropical and subtropical regions, understanding the processes shaping urban coral reefs may be essential for anticipating future conservation challenges. We used a case study approach to identify unifying patterns of urban coral reefs and clarify the effects of urbanization on hard coral assemblages. Data were compiled from 11 cities throughout East and Southeast Asia, with particular focus on Singapore, Jakarta, Hong Kong, and Naha (Okinawa). Our review highlights several key characteristics of urban coral reefs, including “reef compression” (a decline in bathymetric range with increasing turbidity and decreasing water clarity over time and relative to shore), dominance by domed coral growth forms and low reef complexity, variable city-specific inshore-offshore gradients, early declines in coral cover with recent fluctuating periods of acute impacts and rapid recovery, and colonization of urban infrastructure by hard corals. We present hypotheses for urban reef community dynamics and discuss potential of ecological engineering for corals in urban areas.